ALGEBRA 1 Name: Solutions

A Finely Crafted O'Brien Unit 9 PRACTICE Test

Computer Section: You may use programs on your computer like Geogebra, Numbers, Calculator. You may not use the internet or notes. Use a pencil. Show all work and circle your answer. Use your time wisely; you will be able to earn additional credit after the timed portion of the test by completing Supercorrections. When you finish, put away your computer and you can come up to get the non-computer part—you may continue to work on both sections without your computer.

Bonus. Write down the quadratic formula. If you're not sure if you are correct, raise your hand, and I will check your answer.

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

1. You can check any factoring problem by **expanding** the answer. Is the following factoring problem done correctly? Check by **expanding** the answer. If it is incorrect, **give the right answer**.

Problem:

Factor $6p+4pq$.

Student working:

$6p+4pq$

$=2p(4+2q)$

Expanded answer:

$2p(4+2q)$

$8p+4pq$ X

No!

$2p(3+2q)$

2. Using the equation $y=2(x-3)^2-2$, find the following information and graph the function. Be sure to label your axes with numbers!

a. Write the coordinates of the vertex.

(3, -2)

b. Write the equation of the axis of symmetry.

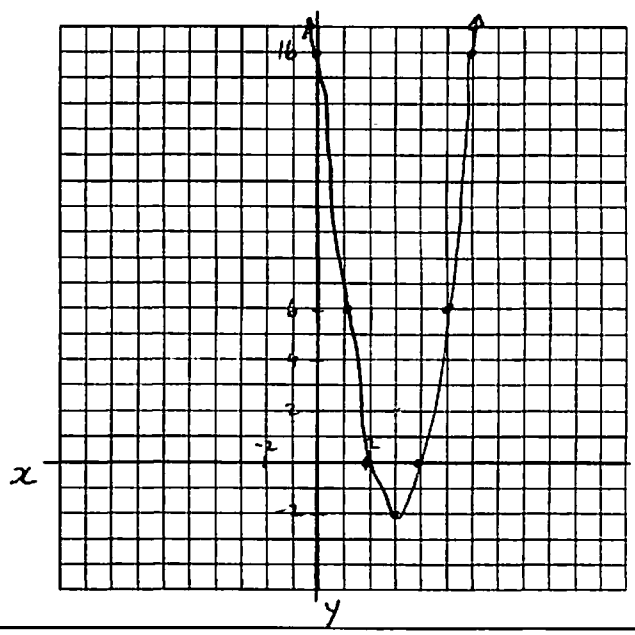
$x=3$

c. Write the *y*-intercept.

(0, 16)

d. Write the *x*-intercepts.

(2, 0) and (4, 0)



3. Find the ~~x-intercept(s)~~ zeros of $y=x^2-2x-4$ accurate to the nearest hundredth. (Hint: Use the quadratic formula!)

$0=x^2-2x-4$

$a=1$

$b=-2$

$c=-4$

$$x=\frac{2\pm\sqrt{4+16}}{2}=\frac{2\pm\sqrt{20}}{2}$$

$x \approx 3.24$ or -1.24

4. Jordan bets Amy she can't find a number that when squared and added to twice itself is 7. Amy says that not only can she do that, but she can find two such numbers! This is how:

a. Amy needs to solve the equation $x^2+2x=7$. Find the values of a, b, and c that she will substitute into the quadratic formula.

$x^2+2x-7=0$

$a=1 \quad b=2 \quad c=-7$

b. Use the quadratic formula to solve $x^2+2x=7$. Give your answers to 3 decimal places.

$$x = \frac{-2 \pm \sqrt{4+28}}{2} = \frac{-2 \pm \sqrt{32}}{2}$$

$x \approx 1.828$ or -3.828

c. Check each answer from the previous question by squaring it and adding it to twice itself (i.e. find x^2+2x). Does it equal 7?

$(1.828)^2+2(1.828) \approx 7$

$(-3.828)^2+2(-3.828) \approx 7$

Almost! Rounding keeps it from being exact.

5. Consider the polynomials $5x+3$ and $2x-1$.

a. Add them.

$(5x+3)+(2x-1)$

$5x+3+2x-1$

$7x+2$

b. Subtract the second from the first.

$(5x+3)-(2x-1)$

$5x+3-2x+1$

$3x+4$

6. Find three different values for b so that the quadratic expression $x^2+bx+36$ can be factored.

1 36
2 18
3 12
4 9
6 6

b could be $\pm 37, \pm 20, \pm 15, \pm 13, \pm 12$

NON-CALCULATOR Name:_____

7. Factor each trinomial.

a. x^2+6x+8

$(x+4)(x+2)$

b. $x^2-4x-21$

$(x-7)(x+3)$

8. Solve each equation (factoring is a good method to use for these!).

a. $x^2-7x+10=0$

$(x-5)(x-2)=0$

$x-5=0 \quad x-2=0$

$x=5$ or 2

Check:

$5^2-7(5)+10=0$ ✓ $2^2-7(2)+10=0$ ✓

b. $x^2+7x=-12$

$x^2+7x+12=0$

$(x+4)(x+3)=0$

$x+4=0 \quad x+3=0$

$x=-3$ or -4

Check:

$(-3)^2+7(-3)=-12$ ✓ $(-4)^2+7(-4)=-12$ ✓

9. Expand and simplify. Show all steps.

a. $(t-7)(t+7)$

$t^2-7t+7t-49$

t^2-49

b. $(2x+3)(x-6)$

$2x^2-12x+3x-18$

$2x^2-9x-18$

10. Mr. Doubleday claims that x^2+x-12 can be factored two different ways: $(x+4)(x-3)$ or $(x-4)(x+3)$. Do you agree with Mr. Doubleday? Why or why not?

No! $(x+4)(x-3)=x^2+x-12$

but

$(x-4)(x+3)=x^2-x-12$

So only $(x+4)(x-3)$ works.

11. Simplify (by getting rid of parentheses and combing like terms!).

a. $(5m^3-4+3m^2)+(2m^3-2m^2+m)$

$5m^3-4+3m^2+2m^3-2m^2+m$

$7m^3+m^2+m-4$

b. $3(x^2-2)-2(3-4x^2)$

$3x^2-6-6+8x^2$

$11x^2-12$

12. Factor by using the GCF.

a. $3x^4+21x$

$3x(x^3+7)$

b. $x(a+b)-2(a+b)$

$(a+b)(x-2)$

13. Ryan needs to factor $x^2-10x+24$. He gets the answer $(x+12)(x-2)$.

a. Multiply and simplify $(x+12)(x-2)$.

$x^2-2x+12x-24$

$x^2+10x-24$

b. How does the answer to part a. show that Ryan has made a mistake in his factoring?

It's not the same!

c. Factor $x^2-10x+24$ correctly.

$(x-6)(x-4)$

14. One of Mr. O'Brien's students has solved the quadratic equation $x^2-4x=0$ by factoring, and the other has used the quadratic formula. Since they get different answers, one has made an error. Circle the error in the incorrect method and fix the mistake so that both methods get the same answer.

Factoring method:

$x(x-4)=0$

$x=0 \quad x-4=0$

$x=0$ or 4

Quadratic Formula method:

$a=1$

$b=-4$

$c=0$

$x=\frac{-(-4)\pm\sqrt{16-4(1)(0)}}{2(1)}$

$=\frac{-(-4)\pm\sqrt{16}}{2}$

$\frac{-(-4)+4}{2}=\frac{8}{2}$ $\quad \frac{-(-4)-4}{2}=\frac{0}{2}$

$x=0$ or -4

4 or 0